



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/297,483	07/19/1999	SHUNICHI SEKI	005317-20009	9831

26021 7590 10/12/2005
HOGAN & HARTSON L.L.P.
500 S. GRAND AVENUE
SUITE 1900
LOS ANGELES, CA 90071-2611

EXAMINER

CLEVELAND, MICHAEL B

ART UNIT PAPER NUMBER

1762

DATE MAILED: 10/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/297,483

Applicant(s)

SEKI ET AL.

Examiner

Michael Cleveland

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 September 2005.
2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 37-49, 51, 62, 64, 66, 83-95 and 113-126 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 37-49, 51, 62, 64, 66, 83-95 and 113-126 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 070605.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 7/6/2005 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 113-126 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayama et al. (U.S. Patent 5,701,055, hereafter '055) in view of Woo et al. (U.S. Patent 6,169,163, hereafter '163) and Pichler et al. (WO98/05187, hereafter '187).

Claims 113 and 126: '055 teaches an organic electroluminescent (EL) element, having a stacked structure including a hole-transporting layer and a light-emitting layer formed within a partitioning member which is divided into individual pixel areas, manufactured by a process comprising:

forming a plurality of anode layers (3);

forming a partitioning member (7, 40) above a substrate (2), the partition member lying at least between adjacent ones of the plurality of anode layers so as to independently partition the

Art Unit: 1762

adjacent ones of the plurality of anode layers (See Fig. 19 and col. 13, lines 49-col. 14, line 6) whereby a plurality of having openings over at least a portion of the anode layer, the openings corresponding to pixel areas (See Fig. 5C, Figs. 8A-8C, Fig. 19), wherein the partitioning member contacts the substrate (Figs. 2, 6, 7, and 15-19 of Nagayama show that the partition walls (7, 40, 60) contact the substrate (2).);

forming a hole-transporting layer and light-emitting layer (two parts of organic layer 8, col. 6, lines 31-59), which are deposited by independently filling each of the openings with the hole-transporting composition (col. 8, lines 41-62), wherein a height of the hole-injecting or transporting layer and the light-emitting layer (and the cathode) is less than that of the partitioning member; and

forming a cathode layer (9) over the light-emitting layer (col. 9, lines 20-52).

A side of the partitioning member contacts the substrate and the anode layer. The anode layer contacts the substrate.

'055 does not teach that the hole-injecting layer contains a conductive material comprising copper phthalocyanine (CuPc). However, the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. '163 teaches the use of CuPc as a hole-transporting layer for organic EL devices (col. 21, lines 10-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used CuPc as the particular hole-transporting material of '055 with the expectation of similar results and with a reasonable expectation of success because '163 teaches that it is an operative hole-transporting material. '163 teaches a preferred thickness of the CuPc layer of 100 nm (0.1 microns) (col. 21, lines 14-20).

'055 and '163 do not teach that the film resistance of the hole injecting or transporting layer is $0.5\text{-}5 \times 10^9 \text{ ohm/m}^2$. However, '187 teaches that the sheet resistance of hole-transporting layers in organic EL devices may be $100\text{-}10^{10} \text{ ohm/square}$ ($10^6\text{-}10^{14} \text{ ohm/m}^2$) (p. 4, last two lines). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a sheet resistance from within this range as the particular sheet resistance of the hole-transporting layer of '055 and '163 with a reasonable expectation of success because '187 teaches that they are suitable sheet resistances for hole-transporting layers of organic EL devices.

Claims 114-120: From MPEP 2113: "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product

Art Unit: 1762

itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted). It is clear that the solvent does not form part of the product because the process recites the step of drying. There is no evidence that the use of particular concentrations, contact angles, viscosities, and surface tensions of the coating solutions cause a structural difference in the formed product.

Claims 121-125: Likewise, the identity of the solvent does not appear to materially affect the dried product, and therefore the product appears to be identical regardless of which solvent is used to deposit the layers.

Claim 126: It is unclear whether the drying removes the lubricant or not. However, the lubricant does not appear to serve any function in the electronic device and therefore, in the absence of a showing of a material difference in the product from the presence of the lubricant, the claims are unpatentable over this combination.

5. Claims 113-126 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayama ‘055 in view of Woo ‘163 and Wilson et al. (U.S. Patent 5,994,835, hereafter ‘835). ‘055 and ‘163 are discussed above, but do not teach that the film resistance of the hole injecting or transporting layer is $0.5-5 \times 10^9$ ohm/m². However, ‘835 teaches that the resistance of hole-transporting layers in organic EL devices affects the current density for a given bias voltage (col. 1, lines 10-18). It has been held that the discovery of the optimum value of a result effective variable in a known process is ordinarily within the skill in the art. *In re Boesch and Slaney*, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the resistance of the hole-transporting layer of ‘055 and ‘163 in order to have achieved the desired current density for a given bias voltage.

6. Claims 37-44, 62, 83-89, and 113-126 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayama ‘055 in view of Woo ‘163 and Pichler ‘187, as applied to claim 113, above, and further in view of Miyashita et al. (U.S. Patent 6,863,961, hereafter ‘961 or its international application publication WO98/24271. References made are to ‘961).

Art Unit: 1762

'055 and '163 are discussed above. '055 teaches vapor deposition of the hole-transporting materials. '163 teaches spin coating of the hole-transporting layer. Therefore, they do not teach applying a solution of CuPc and a solvent by ink-jet printing. '961 teaches that hole-transporting layers (such as CuPc: col. 11, lines 56-64) may be deposited by ink jet printing (col. 11, lines 50-55), and that the ink-jet compositions of the invention use solvents (col. 4, lines 51-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have deposited the CuPc layer of '055 and '163 via ink-jet printing CuPc and a solvent with a reasonable expectation of success because '961 teaches that ink-jet printing is an operative method of depositing hole-transporting layers and teaches that the ink-jet compositions of the invention use solvents.

Claims 38-44, 83-89, 114-120: '961 teaches a contact angle of 30-170°, viscosity of 1-20 cP, and surface tension of 20-70 dyn/cm (col. 9, lines 58-65; col. 10, lines 41-65). '961 does not explicitly teach a concentration with the claimed ranges. However, "differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical." (MPEP 2144.05.II.A.)

7. Claims 37-44, 62, 83-89, and 113-126 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayama '055 in view of Woo '163 and Wilson '835, as applied to claim 113, above, and further in view of Miyashita '961 or its international application publication WO98/24271 for the same reasons given immediately above.

8. Claims 37-45, 48, 51, 62, 64, 66, 83-90, 93, 95, and 113-126 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayama '055 in view of Woo '163 and Pichler '187, as applied to claim 113, above, and further in view of Katsen et al. (U.S. Patent 5,746,817, hereafter '817).

'055, '163, and '187 are discussed above. '055 teaches vapor deposition of the hole-transporting materials. '163 teaches spin coating of the hole-transporting layer. Therefore, they do not teach applying a solution of CuPc and a solvent by ink-jet printing. '817 teaches CuPc may be deposited by ink jet printing CuPc and a solvent (Examples, col. 2, lines 27-32).

Art Unit: 1762

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have deposited the ink-jet layer of '055 and '163 via ink-jet printing CuPc and a solvent with a reasonable expectation of success because '961 teaches that ink-jet printing is an operative method of depositing CuPc and teaches that the ink-jet compositions of the invention use solvents.

Claims 38-44, 83-89, 114-120: The ink-jet compositions of '817 may have weight percents of 2-10 weight percent (col. 4, lines 22-25). The Examiner takes Official Notice that factors such as the flowability of an ink and its wetting ability on a surface are well known parameters in coating processes. The flowability and wetting ability are controlled by the viscosity, surface tension, and contact angle with any dispensing nozzle of the solution. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the viscosity, surface tension, and contact angle with the ink-jet nozzle for the optimum flow and wetting properties.

Claims 45, 48, 51, 64, 66, 90, 93, 95, 121, 124, 126: '817 teaches that the solvent includes water (col. 2, lines 29-34) and a water-miscible compound such as ethylene glycol monobutyl ether, diethylene glycol or glycerin (col. 5, lines 19-30).

9. Claims 37-45, 48, 51, 62, 64, 66, 83-90, 93, 95, and 113-126 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayama '055 in view of Woo '163 and Wilson '835, as applied to claim 113, above, and further in view of Katsen '817 for the same reasons given immediately above.

10. Claims 46-47, 49, 91-92, 94, 122-123, and 125 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayama '055 in view of Woo '163, Pichler '187, and Katsen '817 as applied to claims 37, 62, and 113, above, and further in view of Ogino et al. (U.S. Patent 5,489,671, hereafter '671).

'055, '163, '187, and '817 are discussed above. '817 teaches that the solvent includes water and a water-miscible compound (col. 2, lines 29-34), but does not teach that the water-miscible compound in methanol, ethanol, or ethoxyethanol. However, '671 teaches that methanol, ethanol, and ethoxyethanol are known water-miscible compounds usable in aqueous

Art Unit: 1762

ink-jet inks (col. 10, lines 41-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used methanol, ethanol, or ethoxyethanol as the particular water-miscible compound of '055, '163, '187, and '817 with a reasonable expectation of success because '671 teaches that they are suitable water-miscible organic solvents for use in ink-jet inks.

11. Claims 46-47, 49, 91-92, 94, 122-123, and 125 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayama '055 in view of Woo '163, Wilson '835, and Katsen '817 as applied to claims 37, 62, and 113, above, and further in view of Ogino '671 for the same reasons given immediately above.

Response to Arguments

12. Applicant's arguments filed 9/6/2005 have been fully considered but they are not persuasive.

The rejections under 35 USC 112, 2nd paragraph are overcome by the amendments.

Applicant argues that Pichler teaches anode protection layers rather than hole transporting layer. However, that which lies between the anode and the light-emitting layer in an electroluminescent device is necessarily a hole transporting layer. The very sentence cited by Applicant explicitly states that the anode protection layer "should not act as a barrier to the injection of holes from the anode into the emitting layer", that is, it transports holes. The next sentence of Pichler explicitly states that the layer must have suitable hole transporting and injecting properties.

Applicant argues that one of ordinary skill in the art would have been discouraged from the claimed range by the disclosure of Pichler. The argument is incorrect. The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 U.S.P.Q. 549.

Art Unit: 1762

Applicant argues that Table 13 shows superior luminance for the use of the claimed range of resistance. The statement is incorrect because the luminances listed for resistances below the claimed range overlap those for resistances within the claimed range.

Applicant argues that Jonas does not teach the specific range of $0.5-5 \times 10^9$ ohm/m², and that such ranges are critical because the light-emission characteristics *can* be improved (emphasis added by examiner). Jonas is no longer cited. However, like the range of Jonas, the range of Pichler '187 entirely overlaps the claimed range by containing values both higher and lower than Applicant's. Applicant's results compare the claimed range only to lower values not to the higher values taught by Pichler. Furthermore, the results are not unexpected because it is known that the resistance of a hole-transporting layer affects the current density for a given bias voltage. (See Wilson as cited above.) It has been held that the discovery of the optimum value of a result effective variable in a known process is ordinarily within the skill in the art. *In re Boesch and Slaney*, 205 USPQ 215 (CCPA 1980).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wunderlich (U.S. Patent 5,501,710) is cited for its teachings of ink-jet printing CuPc compositions. Sato et al. (U.S. Patent 5,527,649) is cited for its teachings of surface resistivities of CuPc-containing layers.

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 1762

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (571) 272-1418. The examiner can normally be reached on Monday-Thursday, 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Michael Cleveland
Primary Examiner
Art Unit 1762

10/7/2005